Revista Românească pentru Educație Multidimensională
ISSN: 2066-7329 | e-ISSN: 2067-9270
Covered in: Web of Science (WOS); EBSCO; ERIH+; Google Scholar; Index Copernicus; Ideas RePeC; Econpapers; Socionet; CEEOL; Ulrich ProQuest; Cabell, Journalseek; Scipio; Philpapers; SHERPA/RoMEO repositories; KVK; WorldCat; CrossRef; CrossCheck

2024, Volume 16, Issue 4, pages: 70-96 | https://doi.org/10.18662/rrem/16.4/908
Submitted: August 1, 2024 | *Accepted for publication:* September 25, 2024

Are Digital Education Resources meeting the preliminary needs of „R.E.D. Teacher EDucation" project?

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Abstract: *This study evaluates the preparedness of Romanian public pre-university teachers for digital pedagogy training as part of the R.E.D. Teacher Education project, which aims to enhance lifelong learning and educational quality, in alignment with European Union (EU) standards and Sustainable Development Goal 4 (SDG 4). Data were collected from 1,864 educators through a structured questionnaire aligned with global digital competency frameworks. Results indicate a strong interest in digital tools, though challenges remain, particularly in fostering collaboration and ensuring equitable access to digital resources. The study concludes that targeted professional development is needed to enhance teachers' digital literacy and address the digital divide. Key recommendations include improving access to digital platforms, promoting collaboration, and ensuring responsible use of digital resources to support inclusive, equitable education.*

Keywords: *digital pedagogy; lifelong learning; educational technology; Teacher training; European Union education policy.*

How to cite: Mara, D., Mara, E.-L., Bocoș, M., Rad, D., Hunyadi, D., Vanu, A., & Marcu, R. (2024). Are digital education resources meeting the preliminary needs of „R.E.D. Teacher EDucation" project?. *Revista Românească pentru Educație Multidimensională, 16*(4), 70-96. https://doi.org/10.18662/rrem/16.4/908

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Introduction

Romania's membership in the European Union has strengthened ties with other European nations, impacting a number of areas, including education. In order to ensure that Romania's educational processes reflect European achievements, this integration has highlighted the necessity of alignment with EU criteria (Gaston, 2010). European Council's overview of the European Union's strategic objectives for education and vocational training emphasizes the significance of lifelong learning, mobility, and the improvement of educational quality and efficiency. Alongside these objectives, cultivating creativity and innovation, including entrepreneurial abilities, throughout all educational levels, as well as promoting equity, social cohesion, and active citizenship are also important (Camilleri & Camilleri, 2020).

Teacher preparation and career development are central to European educational policy. Ongoing professional development is essential for ensuring that educators' competencies evolve in response to changing educational needs and curriculum demands (Gumus, 2022; Boeskens et al., 2020). This continuous adaptation is vital for aligning teaching methods with the evolving educational landscape.

Romania's educational policies also demonstrate a commitment to global environmental goals, including the Sustainable Development Goal 4 (SDG 4) set forth by the United Nations, which goes above EU norms. SDG 4 seeks to guarantee inclusive, equitable, high-quality education and to encourage opportunities for lifelong learning for all. Romania's efforts to meet SDG 4, which focuses on improving educational quality, fairness, and lifelong learning, have advanced due to its alignment with the EU framework (Rad et al., 2022). By incorporating these ideas, Romania advances both locally and globally by enhancing educational performance and advancing more general goals of socioeconomic development.

Globally, the COVID-19 pandemic has sparked important modifications to teaching and training practices (Dwivedi et al., 2020; Ellis et al., 2020). Significant shifts have occurred in adult education in recent years, such as a rise in lifelong learning, an increase in informal learning activities, and a larger dependence on non-formal education and training providers. Data from 2021 collected by EUROSTAT indicates that adult participation in education and training programs increased significantly throughout the European Union. For example,

participation rates in Romania increased from 1.0% in 2020 to 4.9% in 2021. However, there are notable differences in participation rates within EU nations, with Belgium (10.2%), Denmark (22.4%), Finland (30.5%), and Sweden (34.7%) having the highest and lowest rates, respectively (Burlacu et al., 2021).

This transition has been greatly aided by the move to online instruction, which requires teachers to maintain a balance between technological and pedagogical expertise (Lee et al., 2022). Due to its increased efficiency, flexibility, and personalization for both teachers and students, online education has grown in popularity (Bećirović, 2023). This shift emphasizes how important it is for teachers to keep improving their digital literacy in order to interact with the dynamic digital environment that is becoming a necessary part of education (Muraille, 2020). Teachers are expected to have a broad and complex skill set as the demands on their job continue to change (Kennedy & Sundberg, 2020). Teachers play an essential part in helping students develop digital competence, which will equip them for both the professional worlds of today and the future as digital technologies become more and more integrated into everyday life. As a result, in order to meet the changing demands of students and the larger societal context, there is an increasing focus on providing educators with complex digital abilities.

Digital education offers numerous advantages, particularly in enhancing human and financial resources within educational settings. It significantly improves the efficiency of teaching, learning, and assessment processes, potentially increasing financial profitability and providing greater flexibility in scheduling educational activities. Moreover, digital tools empower both students and educators by granting access to a broad range of educational resources and facilitating exploration of contemporary topics (Nkomo et al., 2021).

Despite these benefits, the implementation of online education faces several challenges. The absence of widely available, open learning platforms is a significant problem that restricts fair access to educational opportunities for people from various socioeconomic backgrounds (Aissaoui, 2022). The creation and modification of comprehensive curriculum is further hampered by the lack of freely available educational resources that span all subject areas and academic levels (Mian et al., 2020). In addition, the digital divide makes differences in educational results worse, especially for kids who are already

marginalized or at danger of being excluded. It is imperative to make strategic interventions in order to address these issues. Enhancing access to digital platforms and resources, closing the digital gap, and making sure that digital education promotes fair learning outcomes for all students should be the main goals of these initiatives.

The "R.E.D. Teacher Education" project is an educational initiative aimed at enhancing the digital competencies of teachers in Romania's public pre-university education system. The project aligns with the European Union's educational objectives and the United Nations' Sustainable Development Goal 4 (SDG 4), which promotes inclusive and equitable quality education and lifelong learning opportunities for all. By focusing on digital pedagogy, the project seeks to equip teachers with the necessary skills to effectively integrate digital resources into their teaching practices, thus improving the overall quality of education. This paper evaluates whether the available digital education resources are meeting the preliminary needs identified by the R.E.D. Teacher Education project, providing insight into the current state of digital competency among educators and the challenges they face in adapting to new digital teaching methodologies.

Methodology

"Lucian Blaga" University of Sibiu distributed a structured questionnaire to gather information for evaluating the necessity of launching the R.E.D. Teacher Education project, which is aimed at creating and implementing a continuous training program for teachers in the public pre-university education system, focusing on digital and digital pedagogy skills. The purpose of this survey was to obtain information about how prepared public pre-university educators were to participate in training programs that would improve their proficiency in critical digital pedagogy, help them successfully incorporate technology into their lessons, get students ready for the digital age, and improve the standard of education in general. The questionnaire covered a wide range of topics, such as instructional strategies, methods of evaluation, parent-teacher communication tactics, and the development and distribution of digital resources and information. Alignment with the European framework for digital competencies for teachers (DigCompEdu) and globally recognized digital competency standards (e.g., ECDL, Microsoft) guided the questionnaire's development.

The study focused on teachers working in the public pre-university education system, thus data on teachers' desire to participate in training programs across several subject areas was gathered using a questionnaire consisting of 26 items. The majority of the survey's questions were closed-ended, but there were also some open-ended ones that let respondents express their opinions on relevant topics. In addition, there were scaled questions with a significance value of 1 to 4 and dichotomous questions with response alternatives like "Yes," "No," "Urban," or "Rural." The survey ended with a section asking for respondents' permission to express their own thoughts on how personal data is handled, clearly guaranteeing that their answers would be handled strictly confidentially and anonymously in compliance with ethical standards.

Participating in the study were 1,864 respondents who shared demographic data and details on their involvement in teacher training programs for digital education in the public pre-university education system. Table 1 provides descriptive statistics on age, gender distribution, urban/rural residence, and years of teaching experience. Of the 384 respondents in the sample, the largest group (20.6%) is between the ages of 46 and 50. With only 3% of the participants (55 replies), the youngest age group is the smallest, consisting of individuals between the ages of 18 and 23. The distribution of respondents by gender reveals that women make up 86.6% (1,615 respondents) of the sample, while men make up 13.4% (249 respondents). A proportion of 39.5% of respondents (736 respondents) live in rural areas, whereas the majority of respondents (60.5%, or 1,128 respondents) live in metropolitan areas. Regarding teaching experience, the largest group of respondents (32.1%) is made up of those with between 21 and 30 years of experience (599 respondents). In contrast, those with 7-10 years of experience are the least represented, making up 7% of the respondents (131 individuals). This demographic snapshot provides a comprehensive overview of the participants, highlighting a diverse range of backgrounds and experiences (Table 1).

Table 1. Descriptives of participants

Characteristic	Category	Frequency (n)	Percentage (%)
Age	18-23 years	55	3.0%
	24-30 years	123	6.6%
	31-35 years	173	9.3%
	36-45 years	241	12.9%
	46-50 years	384	20.6%
	51-55 years	278	14.9%
	56 and above	610	32.7%
Gender	Female	1615	86.6%
	Male	249	13.4%
Residence	Urban	1128	60.5%
	Rural	737	39.5%
Years of Teaching Experience	0-6 years	365	19.6%
	7-10 years	131	7.0%
	11-20 years	495	26.5%
	21-30 years	599	32.1%
	Over 30 years	275	14.7%

Romanian language, mathematics, English, French, biology, geography, physics, chemistry, physical education and sports, and special psychopedagogy were among the many subjects taught by the responding teachers. Regarding the levels of education they teach, the distribution was as follows: 16 respondents (0.9%) teach at the post-high school level, 18 respondents (1%) at the preschool level, 332 respondents (17.8%) at the high school level, 371 respondents (19.9%) at the primary school level, 519 respondents (27.8%) at the lower secondary level, and 608 respondents (32.6%) at the upper secondary level.

Concerning the availability and equipment of digital devices in schools for facilitating online teaching, the responses varied. A total of 997 respondents (53.5%) indicated that each teacher has access to a laptop or tablet. Another 649 respondents (34.8%) reported that such devices are available but used communally among teachers. Only 339 respondents (18.2%) stated that each student has access to a laptop or

tablet. Additionally, 173 respondents (9.3%) indicated that digital devices are available exclusively for students but require scheduled access. Finally, 151 respondents (8.1%) noted that no digital equipment is available in their schools.

Results

This section presents the findings on the use of digital education platforms, applications, and tools for organizational communication within schools. The information focuses on how these digital tools help in communication between parents, students, and other stakeholders. Of the 1,022 respondents who were questioned about the usage of digital technologies for organizational communication, 54.8% stated that their schools actively employ these tools. This indicates a significant adoption of modern technologies to improve communication channels within educational settings. In contrast, a small percentage of respondents, 1.6% (29 individuals), noted that their schools do not use these digital technologies for organizational communication. This highlights an opportunity for further integration and utilization of digital tools to enhance communication practices across all schools (see Figure 1).

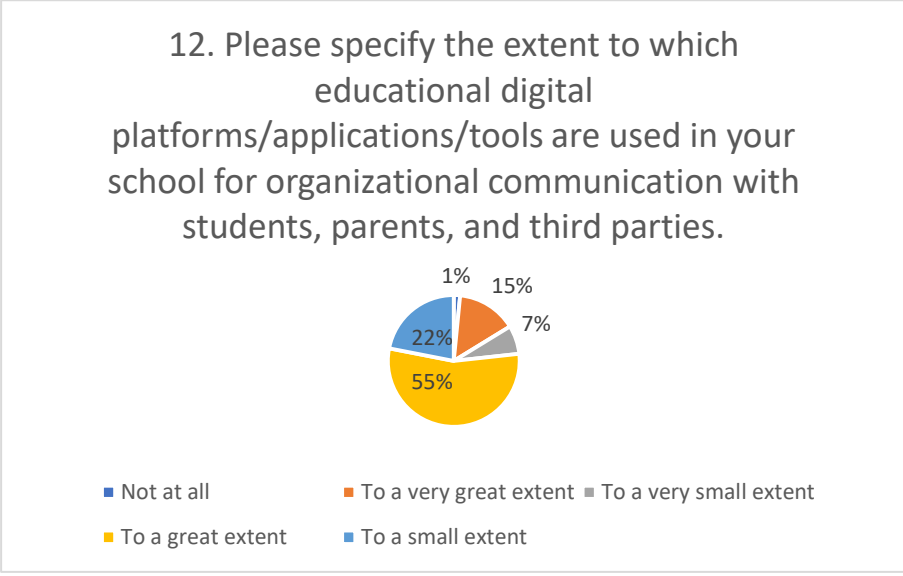


Figure 1. Usage of educational digital tools for organizational communication

The teaching staff respondents exhibited a significant engagement with digital open educational resources in their teaching practices. Specifically, 58.5% (1,091 respondents) reported using these resources extensively. In contrast, a small minority, 6% (12 respondents), indicated that they do not utilize these resources at all (see Figure 2).

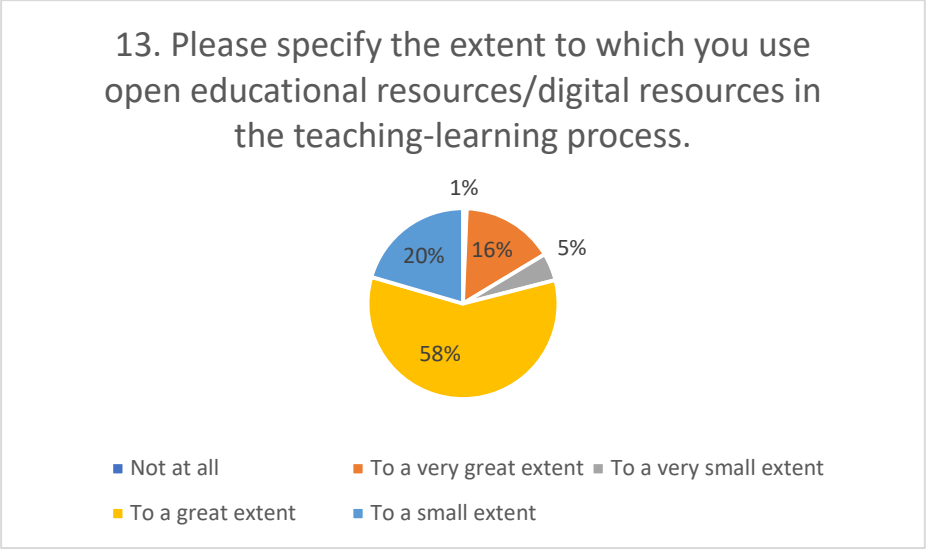


Figure 2. Utilization of open/digital resources in education

The vast majority of respondents—97%—acknowledged the importance of incorporating digital technology into the teaching and learning process and emphasized its critical role in improving teaching methods. On the other hand, as Figure 3 shows, only 3 percent of respondents did not consider that technology was useful in the classroom.

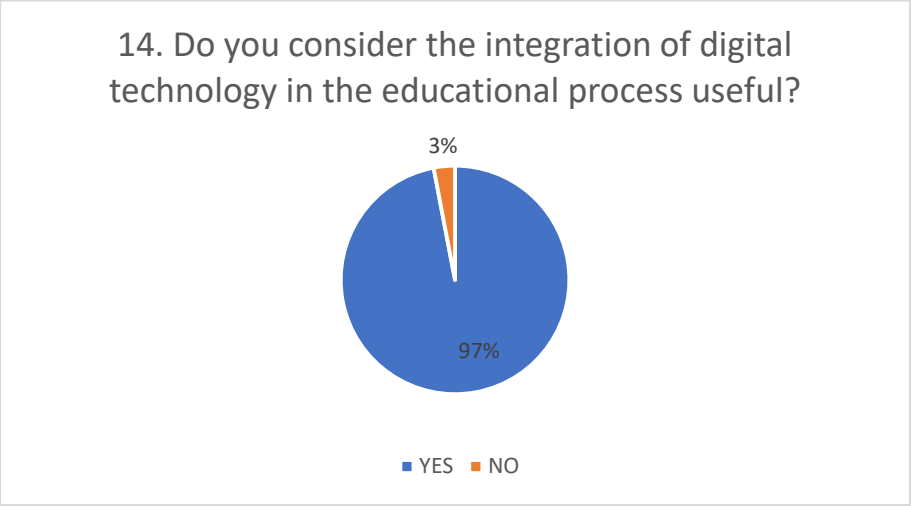


Figure 3. Perceptions on digital technology in education

When 66.5% of respondents evaluated the factors that teachers prioritized when choosing digital resources to employ in instructional contexts, "resource attractiveness" came out on top as the most relevant aspect. "Student needs" and "teacher competence" came in second and third, respectively, with 63.6% and 63.1% of respondents deeming them crucial. Additionally, "teaching context" and "age characteristics of learners" were important to 60% of respondents. In contrast, "pedagogical approach" was prioritized by 47.2% of respondents, while "accuracy of information" was valued by 57.1%. The availability of "free resources" was noted by 45.7%, and "image and sound quality" was a significant factor for 32.4% of respondents, where applicable.

The data reveals that the majority of teachers, 90.5%, predominantly use digital resources to enhance the efficiency of instructional activities. However, only 28.7% of respondents utilize digital resources to promote and improve collaboration among learners.

When it comes to creating digital educational resources, responses were nearly evenly divided: 50.6% of teachers reported having created such resources either independently or collaboratively, while 49.4% indicated they had not engaged in this activity. This distribution reflects a balanced perspective among teachers regarding their involvement in the development of digital educational materials (see Figure 4).

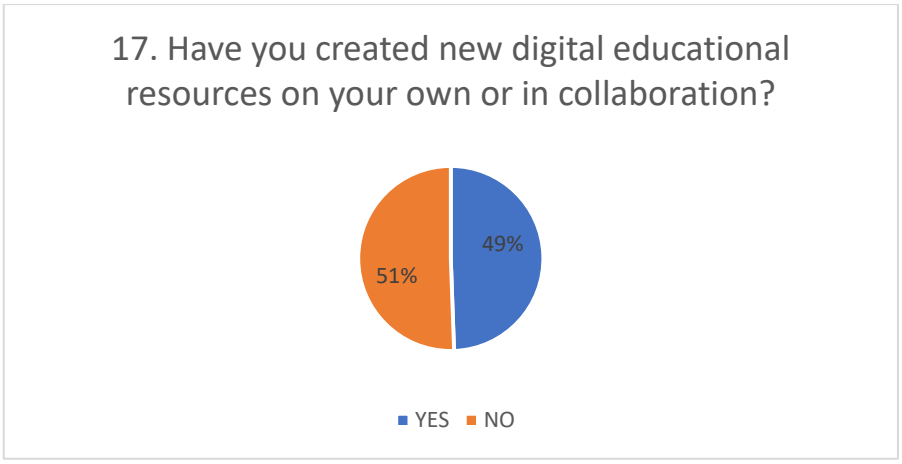


Figure 4. Creation of digital educational resources

A substantial proportion of participants, at 71.3%, expressed acquaintance with the notion of "blended learning," indicating a general comprehension of this pedagogical strategy among educators. On the other hand, Figure 5 shows that 28.7% of respondents indicated they had no prior experience with blended learning.

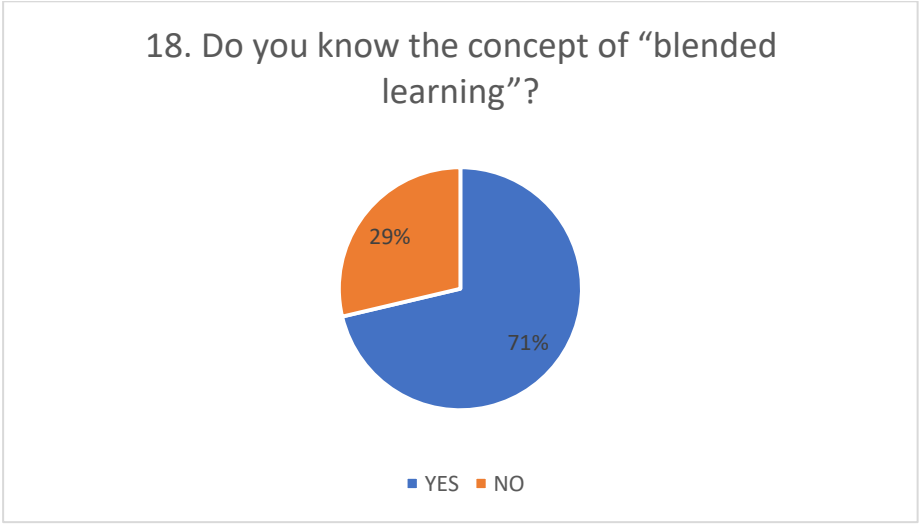


Figure 5. Understanding blended learning

With 84.5% of the respondents indicating a desire to participate, the respondents shown a great interest in taking a course on "digital pedagogy." Conversely, 15.5% indicated reluctance to join the course. This finding highlights a significant enthusiasm among educators for improving their digital teaching practices (see Figure 6).

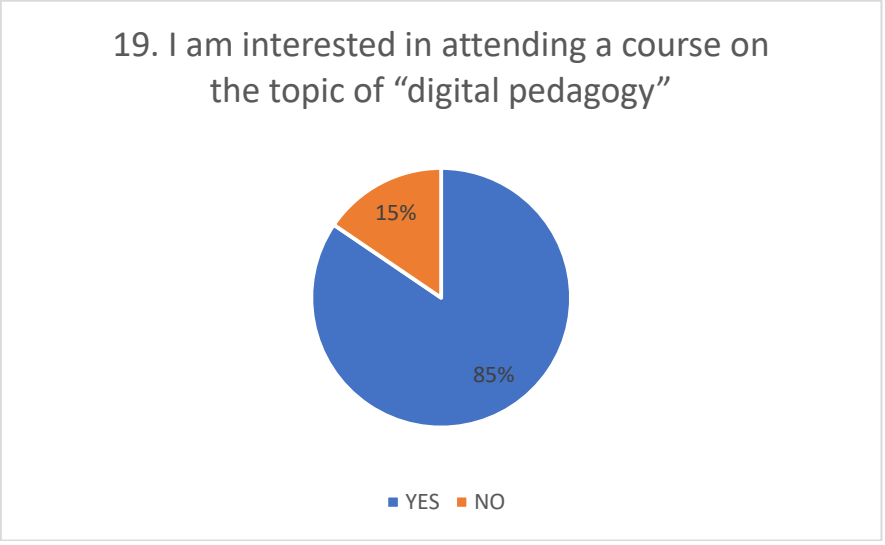


Figure 6. Interest in Digital Pedagogy courses

The study's conclusions show that educators are highly interested in training courses that concentrate on digital pedagogy, with participants indicating a variety of subject priorities. 945 respondents (50.7%) rated the theme "Teaching methods and techniques for online learning" as their top priority, making it the most critical area. On the other hand, 222 respondents (11.9%) thought it was least significant. This implies that there is a significant need for instructional approaches that make good use of internet resources.

Significant interest was also shown in "psycho-pedagogical aspects," which were ranked as most significant by 750 respondents (40.2%) and as least important by 335 respondents (18%). This demonstrates how educators are becoming more conscious of the need to comprehend the psychological aspects of online teaching and learning, which have a big impact on student involvement and results. While 355 respondents (19%) thought it was least essential, 734 respondents (39.4%) thought it was most important, underscoring the

significance of "'Technical and technological aspects." This suggests that educators are beginning to realize how important it is for them to possess the technical know-how needed to effectively operate and use digital resources.

Furthermore, 884 respondents (47.4%) said that "Aspects related to content and digital materials" were the most significant, whereas 381 respondents (20.4%) thought the opposite. This implies that emphasis should be placed on the caliber and applicability of digital content, as this is essential to sustaining student engagement and improving educational opportunities. 855 respondents (45.8%) gave "online evaluation methods and techniques" positive praise, whereas 414 respondents (22.2%) thought it was less critical. This indicates a rising interest in cutting-edge evaluation techniques appropriate for virtual learning settings.

Lastly, there was a lot of interest in "Examples of online lessons / online model lessons," with 928 respondents (49.8%) ranking them as the most important and 439 respondents (23.5%) ranking them as the least essential. This underscores the value educators place on practical, example-based learning resources that can serve as models for effective online instruction.

The poll also showed that teaching staff members place a high value on taking courses that help them become more digitally competent, as defined by frameworks such as DigCompEdu. 869 respondents (46.6%) regarded this element as "most important," while 288 respondents (15.4%) said it was "least important." This is a significant majority. This indicates a strong emphasis on the necessity of developing comprehensive digital skills among educators. Similarly, 824 respondents (44.2%) prioritized participating in online training activities for continuous professional development, underscoring the widespread recognition of the importance of ongoing education in digital pedagogy. However, 294 respondents (15.8%) rated this as less important, highlighting some variance in prioritization.

Courses and activities related to institutional development, organizational communication, and professional collaboration were deemed very important by 709 respondents (38%), with 256 respondents (13.7%) viewing them as less important. This indicates a high awareness among educators of the critical role that collaborative and organizational skills play in the successful integration of digital technologies in education.

The survey found that instructors were very interested in taking courses that addressed the ethical issues, boundaries, and difficulties surrounding the use of digital technology. In particular, 259 respondents (13.9%) showed less interest in these topics, compared to 716 respondents (38.4%) who thought they were extremely essential. This comment emphasizes how teaching staff members are aware of the crucial ethical issues in digital education and how knowledgeable professional development is essential to managing these difficulties. Additionally, there was considerable interest in courses focusing on safety and data protection in digital learning environments, with 795 respondents (42.6%) rating this area as very important. Conversely, 274 respondents (14.7%) rated it as less important, reflecting a significant concern among educators about the need to ensure secure and protected online educational spaces.

These findings highlight diverse priorities among teaching staff concerning professional development in digital education, suggesting the necessity for tailored training programs that address specific challenges and opportunities in the digital era. The respondents' perspectives on the importance of participating in courses related to digital educational resources were similarly diverse. For instance, 892 teachers (47.8%) expressed strong interest in courses on "Open educational resources and practices," while 349 teachers (18.7%) considered this topic less important. This reflects a substantial recognition of the value of open resources in enriching the educational experience.

Additionally, 848 respondents (45.5%) thought that information on "Libraries with digital educational resources" was very significant, while 349 respondents (18.7%) thought it was less important. While 351 respondents (18.8%) thought it less important, 844 respondents (45.2%) said it was a priority to provide digital materials. This suggests a keen interest in the useful applications of creating digital content, which are essential for efficient instruction and learning in contemporary educational environments.

797 respondents (42.7%) gave the element of "Reuse of educational resources" positive comments, emphasizing its importance, whereas 320 respondents (17.2%) gave it a worse rating. Finally, 843 respondents (45.2%) thought that "Responsible use of digital resources" was very important, whereas 336 respondents (18%) thought that it was less significant. This highlights how important it is to teach educators how to use digital content in an ethical and responsible manner. Overall,

these responses reflect varying degrees of importance attributed by teaching staff to different facets of digital resource management and utilization in education. The findings underscore the need for strategic planning and professional development initiatives that are responsive to these diverse priorities, ensuring that educators are well-equipped to optimize educational outcomes in a digital age.

Examining the perceived benefits of engaging in digital teaching, learning, and assessment courses and activities, as described in the DigCompEdu framework (levels 3 and 4), respondents express strong support for a number of different points. For instance, 904 respondents (48.5%) evaluated the importance of "Integrating online tools and digital resources in teaching activities" as extremely essential, while 329 respondents (17.6%) assessed it as less important. This suggests a significant endorsement of using digital materials in the classroom, underscoring the increasing awareness of their significance in contemporary education.

In a similar vein, 864 respondents (46.3%) thought well of the theme "Teaching with digital technologies, visual supports, interactive teaching, and distance teaching," whereas 326 respondents (17.5%) thought less of it. This emphasizes how much interest there is in using digital technologies to improve teaching strategies and create more interesting and productive learning environments.

Furthermore, 807 affirmative replies (43.3%) were received in response to the question "Learning with digital technologies, collaborative learning, and self-regulated learning," indicating a great appreciation for the role that digital tools play in promoting independent and collaborative learning. Meanwhile, 321 respondents (17.2%) rated this aspect as less important, indicating some variability in priorities. The aspect of "Evaluation with digital technologies, learning analytics, feedback, and planning" was positively rated by 774 respondents (41.5%), contrasting with 302 respondents (16.2%) who viewed it as less critical.. This shows that the importance of digital tools in improving the processes of evaluation and feedback in educational settings has been acknowledged.

782 respondents (41.9%) rated the topic of "Communicating and collaborating online, using digital communication platforms and tools" as extremely important, while 315 respondents (16.9%) rated it as less important. This emphasizes how important it is for digital communication tools to support productive teamwork and communication in learning environments.

Additionally, activities focusing on Digital Technologies in Education, as detailed in DigCompEdu 6, elicited substantial interest from teaching staff. 753 respondents (40.4%) thought the topic "Introduction to basic digital tools and technologies for education" was extremely important, while 291 respondents (15.6%) thought it was less important. This illustrates the high demand for fundamental understanding of digital tools, which is necessary for teachers to successfully incorporate technology into their lessons. In a similar vein, 677 respondents (36.3%) gave favourable answers to the question "The role of technologies in professional, social, cultural, and personal life," compared to 263 respondents (14.1%) who gave unfavorable answers. This emphasizes the need for a comprehensive grasp of technology's place in society and draws attention to the wider effects of digital technologies outside of the educational field.

A total of 794 respondents (42.6%) evaluated the notion of "Digital competence of students - key competences area, school success, and professional success" as very important, while 307 respondents (16.5%) rated it as less important. This indicates a strong emphasis on equipping students with digital skills crucial for their academic and professional success. Topics such as "Digital skills according to the DigCompEdu framework," "Development of digital skills throughout the curriculum," and "Digital citizenship - digital literacy, critical thinking, responsibility" also attracted significant interest, with positive responses from 730 (39.2%), 768 (41.2%), and 700 (37.6%) respondents, respectively.

The respondents expressed significant interest in courses and activities focused on leveraging technology to promote active learning, as outlined in DigCompEdu 5. Specifically, 825 respondents (44.3%) rated the theme "Current didactic approaches/orientations, active involvement of students, and the role of technologies in supporting attention, motivation, and the development of thinking and imagination" as very important. In contrast, 292 respondents (15.7%) rated it as less important. Similarly, "Models of classes/groups and working manners" were deemed very important by 768 respondents (41.2%), while 277 respondents (14.9%) considered it less important.

The theme "Examples of learning activities in the blended-learning system" received a favorable response from 859 respondents (46.1%), with 318 respondents expressing less interest. Additionally, "Accessibility and inclusion, differentiation, and personalization" were highly valued by 770 respondents (41.3%), indicating a strong emphasis

on creating inclusive learning environments. However, 280 respondents (15.0%) rated this aspect as less important. The focus on "Monitoring student progress through digital tools/data" was also highlighted as very important by 821 respondents (44.1%), underscoring the critical role of digital tools in tracking educational outcomes, though 306 respondents (16.4%) were less concerned with this aspect. These results emphasize educators' keen interest in enhancing pedagogical practices through digital technologies, particularly in areas like active learning, personalized instruction, and effective monitoring of student progress.

Further highlighting the importance of digital pedagogy, courses focusing on future challenges and advanced pedagogical practices, as outlined in DigCompEdu 1 and 6, are highly valued by respondents. The concept of "New types of learning paths (inverted classroom, blended learning, mixed reality/AR/VR) and curriculum design for digital education" was considered very important by 770 respondents (41.3%), with 351 respondents (18.8%) rating it as less important. Similarly, the incorporation of "Artificial intelligence and changes in the curriculum" garnered 661 positive responses (35.5%) as very important, while 324 respondents (17.4%) viewed it as less critical.

Courses on "New didactic experiences and reflective practices" were seen as crucial by 773 respondents (41.5%), indicating strong support for innovative teaching methods, while 343 respondents (18.4%) rated this aspect lower. Additionally, the importance of "Pedagogical skills and roles of the teacher in a digital society" and "Management of online learning resources" was emphasized by 804 respondents each (43.1%), highlighting the relevance of these skills in contemporary education. However, 353 respondents (18.9%) rated "Management of online learning resources" as less important.

These results, taken together, show that educators are well aware of the critical role that digital pedagogy will play in influencing future teaching methods. It is evident that there is a need to ensure that education stays up with technology changes by preparing teachers for new problems and incorporating creative techniques into curriculum design and classroom management.

Discussion

The study's conclusions offer important new perspectives on how Romanian educators view digital pedagogy and how best to incorporate it into their practices. The majority of respondents stressed

the significance of improving their abilities to use digital resources for teaching and learning, and they indicated a strong desire to take part in training programs centered on digital pedagogy. This is consistent with earlier studies that highlight the increasing importance of digital competency for educators (McMichael et al., 2022). The high proportion of respondents endorsing courses related to "Teaching methods and techniques - online learning" and "Psycho-pedagogical aspects" suggests a clear recognition of the need for professional development in these areas (Ouyang et al., 2022).

Furthermore, the study highlighted varying degrees of importance attributed to different aspects of digital pedagogy. For instance, while "Integration of online tools and digital resources in teaching activities" received strong endorsement. This finding echo previous studies that have emphasized the challenges and complexities associated with fostering collaborative learning in digital environments (Ahmad et al., 2020; Hertz et al., 2022).

The positive attitudes towards digital educational resources, including open educational resources and digital libraries, also resonate with existing literature. Educators recognize the potential of these resources to enhance teaching effectiveness and support personalized learning experiences (Hilton, 2020). Conversely, concerns about the responsible use of digital resources and data protection highlight ongoing issues that educators and policymakers must address to ensure safe and ethical practices in digital education (Brata et al., 2022). The findings related to the familiarity with blended learning and the adoption of digital tools for assessment and feedback reflect a progressive attitude towards educational innovation. Because they may accommodate a variety of learning requirements and preferences by combining in-person instruction with online learning modalities, blended learning approaches, in particular, have gained popularity (Hebebcı & Ozer, 2023).

The study's conclusions, which emphasize the growing importance of digital competency among educators, are consistent with the larger body of research on digital pedagogy. As Grosseck et al. (2020) discuss, the integration of Open Educational Resources (OER) has been essential in promoting accessibility and inclusivity in education, a trend that our respondents also recognized. This is particularly relevant in the Romanian context, where the digitalization of the education system is rapidly advancing (Stroe, 2022).

The differing focus on various elements of digital pedagogy, including the incorporation of online technologies as opposed to fostering cooperation, mirrors overarching developments in Romanian higher education. Grosseck et al. (2019) observe that despite a substantial impetus for digitization, obstacles persist in the comprehensive application of digital technologies for collaborative learning, a conclusion that aligns with our findings. Moreover, our study's recognition of the necessity for professional growth in digital pedagogy aligns with existing research regarding the effects of digital innovation in education. Țițan et al. (2020) assert that educators must perpetually enhance their competencies to effectively integrate new technologies into their lesson plans amidst digital innovation. Neagu's (2022) study on digital competency underscores the necessity for ongoing training to adapt to evolving educational technologies. The literature articulates apprehensions over data protection and the appropriate utilization of digital resources. Bran & Grosseck (2020) examine the obstacles of digitalizing education during tumultuous periods, emphasizing the necessity for comprehensive policies to guarantee data security and ethical standards. This corresponds with our respondents' apprehensions and highlights the essential function of institutional support in addressing these difficulties.

Favorable attitudes towards digital assessment tools and integrated learning suggest broader adoption of these methodologies in contemporary education. Dobrila (2020) noted that the epidemic has led to an increased adoption of blended learning methodologies, integrating traditional and online teaching methods to enhance student performance. Our research unequivocally demonstrates this inclination, with educators articulating a robust aspiration to incorporate digital resources into their pedagogical methodologies.

Our study's theoretical ramifications suggest that teachers are becoming more adept at negotiating the challenges of digital education. This enhanced competency is reflected in their nuanced understanding of integrating technology into their teaching practices. These findings align with Holotescu & Grosseck's (2018) analysis of MOOC-related strategies in Romania, which underscores the growing sophistication in digital pedagogical practices. Their work illustrates how educators are evolving in their approach to digital teaching, adapting to new technologies with increasing expertise. Overall, by offering actual data on Romanian educators' viewpoints on digital pedagogy, our findings

add to the body of current literature. This emphasizes how crucial it is to integrate digital technologies strategically and engage in ongoing professional development, as Vasylenko et al. (2022) also covered in their analysis of contemporary platforms and online services. The dynamic character of teaching and learning in the digital age is further highlighted by Stepanenko et al.'s (2023) exploration of the changing role of educators in using e-learning tools. As a result, our research supports Padagas et al.'s (2023) assertion that focused professional development programs are essential for meeting the varied requirements of educators. These courses are crucial for developing digital competences, which can improve instruction in increasingly digitalized learning environments.

The study's conclusions have a number of useful implications for academic institutions looking to improve their use of digital teaching. Educators' keen interest in particular training programs emphasizes the necessity of professional development initiatives aimed at enhancing digital competencies. By using these insights, educational institutions can design customized training programs that cater to the particular needs that have been discovered and encourage the efficient use of digital resources in the classroom. The study's theoretical ramifications show how digital pedagogy is changing in the context of contemporary schooling. Teachers' varied preferences on different facets of digital pedagogy demonstrate a comprehensive knowledge of technology integration and teaching techniques. This emphasizes how important it is to conduct continuing study to better understand the intricate relationships that exist between pedagogical approaches, digital technology, and learning outcomes in various educational settings.

The study's findings corroborate existing research, indicating that educators increasingly acknowledge the importance of digital competencies and support initiatives aimed at enhancing these skills. This aligns with the observations of Shuliar et al. (2023), who emphasize the growing role of artificial intelligence in education. Our study suggests that teachers are not only aware of emerging technologies but are also enthusiastic about engaging with them. This enthusiasm mirrors a broader trend toward incorporating advanced technological tools into educational practices, as discussed by Volos et al. (2023), who examine the development of smart technologies in education.

The emphasis on the careful selection and psycho-pedagogical adaptation of digital resources aligns with the findings of Nefedchenko

et al. (2023), who underscore the importance of tailored technological integration in education. This approach ensures that digital tools enhance learning experiences while minimizing potential negative impacts on students. Additionally, our study's focus on recognizing the risks associated with digital technologies echoes the concerns raised by Honcharuk et al. (2023). Their study emphasizes the necessity of using neuropedagogical strategies to solve interaction and communication difficulties in online learning environments. This emphasizes how essential it is for educators to understand the moral and psychological implications of using digital technology. Research has shown that digital platforms and open educational resources, when carefully integrated, can significantly enhance educational efficiency and student engagement (Tur et al., 2016). However, as Dzvinchuk et al. (2020) highlight, the challenge lies in ensuring that these digital tools are accessible and adapted to postmodern education. Addressing the digital divide, as discussed by Afzal et al. (2023), remains essential to guarantee equitable access and effective use of technology in education.

Moreover, the demand for ongoing professional development in digital pedagogy is consistent with the recommendations made by Lytvynov et al. (2022) on the integration of educational innovations, including e-learning tools, in teacher preparation programs. This need for continuous professional development and adaptation is reflected in our recommendation for focused training programs to assist educators in adjusting to the changing technology world.

While this study offers valuable insights, it is important to recognize several limitations. First, the data gathered is based on self-reported responses, which may be subject to biases such as subjective interpretation and social desirability. This could influence the accuracy of the findings. Additionally, the study is limited to teachers in Romania's state pre-university education system, which may affect the generalizability of the results to other educational contexts, geographic areas, or countries. As such, the findings may not fully reflect the broader global or international landscape.

The structured questionnaire used in this study, while comprehensive, may have constrained the depth of qualitative insights that could have been obtained through more interactive methods such as focus groups or interviews. This limits the ability to explore more nuanced experiences and perspectives.

Future research should consider longitudinal studies to assess the long-term impact of digital training programs on teaching practices and student outcomes. More qualitative research could provide deeper insights into the specific challenges and successes teachers face in integrating digital technology into diverse learning environments. Additionally, comparative studies across different educational systems or countries would offer valuable perspectives on the international relevance of digital pedagogy. Further exploration of advanced technologies, such as virtual reality and artificial intelligence, could also reveal their potential to enhance teaching methods and improve student learning outcomes on a larger scale.

Future studies should investigate the long-term effects of digital training programs and the incorporation of cutting-edge technology like virtual reality and artificial intelligence in light of these findings. According to Shuliar et al. (2023), research in this field may provide insightful information about how these technologies might improve learning results. Furthermore, as suggested by Volos et al. (2023), comparative research across different educational systems may provide insight into the ways institutional and cultural factors influence the uptake of digital pedagogy.

Conclusions

The primary aim of this questionnaire was to evaluate the readiness of teaching staff in state pre-university education for continuous training programs focused on developing digital competencies and digital pedagogy. The results reveal strong support among educators for implementing such training initiatives. Teachers in state pre-university education clearly understand the significance of ongoing professional development in digital competencies and pedagogical practices. This awareness highlights their proactive stance towards self-assessment and their recognition of the evolving educational environment in schools and society. There is evident enthusiasm for integrating modern technological advancements into teaching practices, ensuring these practices are tailored to students' developmental stages and individual needs.

The findings of this study highlight the critical role that digital resources play in the transformation of the education system, particularly within the framework of the R.E.D. Teacher Education project. The data collected from 1,864 public pre-university teachers reveals a strong

interest in integrating digital tools into educational practices, despite challenges related to resource accessibility and collaboration. The results underscore the need for targeted professional development programs that address digital literacy gaps and ensure that teachers are equipped with the skills necessary to meet modern educational demands.

A key takeaway from the study is the urgency of addressing the digital divide, which poses a significant barrier to equitable access to educational resources, especially in rural areas. The study also emphasizes the importance of fostering collaboration among educators and students through digital tools, as well as promoting the responsible and ethical use of digital resources in the classroom.

Our recommendations focus on improving access to digital platforms, enhancing teacher training programs with a stronger emphasis on practical digital skills, and developing strategies that promote inclusive and equitable learning environments. The findings of this study provide a foundation for the next steps in the R.E.D. Teacher Education project, ensuring that future interventions are well-informed and aligned with the specific needs of educators.

In summary, this study contributes to the understanding of how digital education resources can be effectively leveraged to enhance teaching quality and inclusivity. The evidence presented emphasizes that while progress has been made, significant work remains to ensure that teachers are fully prepared to navigate the digital demands of modern education.

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